REMARKS

The Office Action of May 10, 2007 has been received and its contents carefully considered.

Claims 1-38 are pending in this application. The present Amendment revises the independent claims by adding the limitation "be transmitted through a communications medium to a receiver."

Section 2 of the Office Action rejects independent claims 1, 11, 18, and 30 (along with several dependent claims) under 35 U.S.C. 103(a) as being unpatentable over Nakamura (US 5,216,693) in view of Hirzel et al (US 4,606,052, which will hereafter simply be called simply "Hirzel"). The rejection is respectfully traversed for at least the reasons that the prior art references do not teach, suggest or disclose all features of the claimed invention to one of ordinary skill in the art.

Claim 1, as amended, recites a method for encoding a data signal, comprising:

> encoding the data signal into an encoded data signal, wherein the encoded data signal is a first DC-balanced signal; and
>
> spreading the encoded data signal with a spreading code to generate an output transmission signal to *be transmitted through a communications medium to a receiver*, wherein the output transmission signal is a second DC-balanced signal.

Claim 18, as amended, recites an apparatus for encoding a data signal, comprising:

> an encoder for encoding the data signal into an encoded data signal and outputting the encoded data signal, wherein the encoded data signal is a first DC-balanced signal;
>
> a spreading code generator for outputting a spreading code; and
>
> a spreader coupling to the spreading code generator and the encoder, for spreading the encoded data signal according to the spreading code and outputting an output transmission signal *to be transmitted through a communications medium to a receiver*,

wherein the output transmission signal is a second DC-balanced signal.

Independent Claims 1 and 18 are allowable for at least the reason that neither Nakamura nor Hirzel teaches, discloses or suggests encoding the data signal into an encoded data signal, wherein the encoded data signal is a first DC-balanced signal and spreading the encoded data signal with a spreading code to generate an output transmission signal to be transmitted through a communications medium to a receiver, wherein the output transmission signal is a second DC-balanced signal.

To begin, it is respectfully submitted that Nakamura does not disclose **encoding the data signal into a DC-balanced signal first, and then spreading the encoded data signal** in accordance with claims 1 and 18. It is known in the art that a PN code sequence is used for **spreading** the original signal into a spread spectrum signal. Thus, the PN code sequence disclosed by Nakamura is not used for **encoding the data signal into a DC-balanced signal first before it is spread with PN sequence.** In addition, Hirzel does not disclose anything about **encoding the data signal into a DC-balanced signal first, and then spreading the encoded data signal**, either.

In addition, it is respectfully submitted that the portions of both Nakamura and Hirzel identified in the Office Action are actually directed to the **receiver end** of a spread spectrum communications system. On page 2, the Office Action takes the position that Nakamura has already disclosed **correlating with a PN code**. However, it is known in the art that **correlating with a PN code** is always performed in the **receiver end** for recovering the original transmitted signal. It should be noted that Nakamura's correlater 23 and transformed PN code generator 26 (see Figure 3 of the reference) are both at the **receiver end**. Similarly, relevant figures in Hirzel pertain to a **receiver** in a

communications system. However, claims 1 and 18 are now clearly directed to spreading coding at the ***transmitter end***, and a person of ordinary skill in the art will appreciate that spreading coding operations at the transmitter end and at the receiver end are fundamentally distinct.

Although Hirzel in its background section (see col. 1 line 60 to col. 2 line 2 of Hirzel) briefly mentions that Manchester-encoded signals having no DC component are well suited for transmission through AC coupled systems, this paragraph actually describes DC-balanced signals output from a transmitter end. As noted above, the focus of Nakamura and the specific portions therein cited in the Office Action are directed to the receiver end of a communications system. It cannot be reasonably concluded that a person of ordinary skill in the art would be motivated either by the disclosure of the cited references, or by his knowledge, to combine a correlater 23 at a receiver end in Nakamura, with a DC-balanced signal output from a transmitter end in Hrizel, to achieve the invention of claims 1 and 18, because with the only reasonable combination, said DC-balanced signal, coming out of a transmitter, can only be combined to inject into, but not as the **output** of, the correlater 23 of Nakamura, for the correlater 23 being the receiving component, which receives signals from a transmitter, of the receiver of Nakamura. Therefore, the rejection under 103 should not stand because the combination of the two cited references is inappropriate.

Moreover, the combination of Nakamura and Hirzel, and particularly the disclosure of Nakamura, fails to teach each and every claim limitation of the independent claim 18. Claim 18, directed to the structure as shown in Figure 3 of the present application, recites **an encoder** for encoding a data signal into a DC-balanced signal, **a spreading code generator** for outputting a spreading code, and **a spreader coupling to the spreading**

code generator and the encoder, for spreading the encoded data signal according to the spreading code and outputting an **output transmission signal to be transmitted through a communications medium to a receiver**. However, Nakamura only discloses a correlater 23, a loop filter 24, a voltage control oscillator 25, and a transformed PN code generator 26. Thus, Nakamura only disclosed four devices forming a synchronous loop at the receiver end, and fails to disclose **an encoder** for encoding a data source into a DC-balanced signal, **a spreading code generator** for outputting a spreading code, and **a spreader coupling to the spreading code generator and the encoder** for spreading the encoded data signal according to the spreading code and outputting an **output transmission signal to be transmitted through a communications medium to a receiver** ***at the transmitter end*** in accordance with claim 18.

Independent claim 11, as amended, recites a method for encoding a data signal, comprising:

> generating a spreading code, wherein the spreading code contains a direct current (DC) component;
>
> encoding the spreading code into an encoded spreading code, wherein the encoded spreading code is a first DC-balanced signal; and
>
> spreading the data signal with the encoded spreading code to generate an output transmission signal *to be transmitted through a communications medium to a receiver*, wherein the output transmission signal is a second DC-balanced signal.

Independent claim 30, as amended, recites an apparatus for encoding a data signal, comprising:

> a spreading code generator for outputting a spreading code, wherein the spreading code contains a direct current (DC) component;

an encoder coupling to the spreading code generator, for encoding the spreading code and outputting an encoded spreading code, wherein the encoded spreading code is a first DC-balanced signal; and

a spreader coupled to the encoder, for spreading the data signal according to the encoded spreading code, and outputting an output transmission signal *to be transmitted through a communications medium to a receiver*,

wherein the output transmission signal is a second DC-balanced signal.

Independent Claims 11 and 30 are allowable for at least one reason that neither Nakamura nor Hirzel teaches, discloses or suggests spreading the data signal with the encoded spreading code to generate an output transmission signal *to be transmitted through a communications medium to a receiver,* wherein the output transmission signal is a second DC-balanced signal.

As discussed above, the portions of both Nakamura and Hirzel relied on in the Office Action are actually directed to the **receiver end** of a spread spectrum communications system. The Office Action takes the position that Nakamura has already disclosed **a transformed PN code generator 26 for outputting a spreading code** (column 6, lines 12-16 of Nakamura). However, the transformed PN code generator 26 in Nakamura's Figure 3 is at the **receiver end**. Similarly, the relevant figures in Hirzel pertain to a **receiver** in a communications system. Claims 11 and 30 are directed to spreading coding at the ***transmitter end***, and a person of ordinary skill in the art would appreciate that spreading coding operations at the transmitter end and at the receiver end are fundamentally distinct. As a matter of fact, the operations disclosed by Nakamura and Hirzel serve to function similarly to those shown in Figure 2 of the present application, i.e., the operations at the receiver end. For the above reason, it is respectfully submitted that Nakamura and Hirzel fail to disclose, teach, or suggest **spreading the data signal with a**

encoded spreading code to generate an output transmission signal *to be transmitted through a communications medium to a receiver,* wherein the output transmission signal is a second DC-balanced signal, in accordance with claims 11 and 30.

Moreover, the combination of Nakamura and Hirzel, and particularly the disclosure of Nakamura, fails to teach each and every claim limitation of the independent claim 30. Claim 30, directed to the structure as shown in Figure 5 of the present application, recites **a spreading code generator** for outputting a spreading code, **an encoder coupling to the spreading code generator**, for encoding the spreading code and outputting an encoded spreading code, and **a spreader coupled to the encoder**, for spreading the data signal according to the encoded spreading code, and outputting an output transmission signal to be transmitted through a communications medium to a receiver. However, Nakamura only discloses a correlater 23, a loop filter 24, a voltage control oscillator 25, and a transformed PN code generator 26. Thus, Nakamura only disclosed four devices forming a synchronous loop at the receiver end, and fails to disclose **a spreading code generator** for outputting a spreading code, **an encoder coupling to the spreading code generator**, for encoding the spreading code and outputting an encoded spreading code, and **a spreader coupled to the encoder**, for spreading the data signal according to the encoded spreading code, and **outputting an output transmission signal to be transmitted through a communications medium to a receiver *at the transmitter end*** in accordance with claim 30.

Section 4 of the Office Action rejects independent claims 6 and 25 under 35 U.S.C. 103(a) as being unpatentable over Ichihara (US 5,640,413) in view of May et al (U.S. 5,327,127, which will hereafter be called simply "May"). The rejection is respectfully traversed.

Claim 6, as amended, recites a method for encoding a data signal, comprising the steps of:

> spreading the data signal with a spreading code to generate a transmission signal, wherein the transmission signal corresponds to the data signal; and
>
> encoding the transmission signal into an output transmission signal *to be transmitted through a communications medium to a receiver*, wherein the output transmission signal contains bits, the value of each bit is either a first value or a second value, and the number of bits with the first value is equal to the number of bits with the second value in the output transmission signal,
>
> wherein the output transmission signal is a DC-balanced signal.

Claim 25, as amended, recites an apparatus for encoding a data signal, comprising:

> a spreading code generator for outputting a spreading code;
>
> a spreader coupled to the spreading code generator, for spreading the data signal according to the spreading code, and outputting a transmission signal; and
>
> an encoder coupled to the spreader, for encoding the transmission signal and outputting an output transmission signal *to be transmitted through a communications medium to a receiver*, wherein the output transmission signal contains bits, the value of each bit is either a first value or a second value, and the number of bits with the first value is equal to the number of bits with the second value in the encoded data signal,
>
> wherein the output transmission signal is a DC-balanced signal.

Independent Claims 6 and 25 are allowable for at least one reason that neither Ichihara nor May teaches, discloses or suggests spreading the data signal with a spreading code to generate a transmission signal and encoding the transmission signal into an output transmission signal to be transmitted through a communications medium to a receiver.

To begin with, it is respectfully submitted that Ichihara does not disclose spreading a data signal first, and then encoding the transmission signal in accordance with claims 6 and 25. Claims 6 and 25 are directed to the structure shown in Figure 4 of the present application, which requires **spreading a data signal with a spreading code to generate a transmission signal, and then encoding the transmission signal into a DC-balanced output transmission signal**. However, the passage at column 4, lines 6-14 of Ichihara and Figure 3 of the reference indicate that Ichihara discloses **encoding before, but not after, spread spectrum operation of the multiplier 11**. Therefore, Ichihara fails to teach, suggest, or disclose spreading the data signal with a spreading code to generate a transmission signal, wherein the transmission signal corresponds to the data signal, and encoding the transmission signal into an output transmission signal to be transmitted through a communications medium to a receiver, in accordance with claims 6 and 25.

Since the remaining claims that have been rejected depend from the independent claims discussed above and recite additional limitations to further define the invention, they are patentable along with their independent claims and need not be further discussed.

For the foregoing reasons, it is respectfully submitted that this application is now in condition for allowance. Reconsideration of the application is therefore respectfully requested.

Respectfully submitted,

Allen Wood

Allen Wood
Registration No. 28,134
Rabin & Berdo, P.C.
Customer No. 23995
(202) 326-0222 (telephone)
(202) 408-0924 (facsimile)

AW/ng